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as showing that even the lower animals were not exempt from morbid growths and lesions of the most serious character. Tumors of the kind described in the oyster are probably very rare, however, and the speaker considered that it was very fortunate that the specimen had fallen into the hands of a naturalist, such as Professor Leidy, who could so well appreciate its importance and value. The tumor seems to have been benign in character, as the oyster in other respects appears to have been healthy. It was also localized, and did not appear in other parts of the animal; so that it was probably in no way infectious.

*Modification of Habit in Ants through fear of Enemies.*—Dr. HENRY C. MCCOOK described a raid of the Sanguine ants, *Formica sanguinea*, which occurred in a vacant lot at Asbury Park, N. J. The co-operative nest of the two species was established quite near the sidewalk, and the raid was directed thence into the open lot. The marching column of Sanguines was accompanied by a few individuals of the black slaves. What special purpose the latter had he was not able to determine. The eagerness exhibited by the Sanguines upon the march was very noticeable, although these creatures are always active in the nest and at any domestic labor as well as war, in which respect they differ largely from the shining slave makers, *Polyergus lucidus*.

On the occasion of which he spoke, the nest of Fuscous ants, *Formica fusca*, against which the expedition was directed, was concealed among a large amount of forest rubbish, such as bits of broken chips, twigs, dried leaves, etc., that were scattered over the barren space, interspersed here and there with tufts of grass and low huckleberry bushes. The invaders had evidently located the nest, but not with absolute accuracy; at least they were not able to determine the point at which it might successfully be assaulted. A most animated scene was presented over the entire surface, some three feet in diameter, upon which was concentrated the united energies of the warriors. Over and around this space in various lines the ants wandered, crossing and criss-crossing each other's pathways, sometimes singly, sometimes in couples or triplets, or in larger crowds, but always exhibiting an attitude of fevered eagerness, applying their mandibles and mouth-parts continually to the ground in search of the point of vantage which would give them ingress to the coveted treasures of the Fuscous ants.

A space about ten inches in diameter, strewn with dry chippage seemed to represent the locality beneath which the blacks had established their fornicary. The Sanguines energetically pulled away the chips, scattered them here and there, burrowed lightly in the earth hoping to obtain an opening. About two feet distant from this point the speaker discovered a small round entrance or gate which was soon identified as one of the outer approaches to the Fuscous nest, for several of these ants were

seen issuing from the gate and others were hovering around it. At this moment one of the Sanguine army, in the spirit of a pioneer or scout, approached this point. Thereupon the blacks climbed up adjacent spears of grass, where they remained apparently on guard. After about ten minutes spent in the exploration which has been described, the reds began to drain off from the centre of search towards their home. In the meantime a considerable number of the Fuscas, who had evidently been out upon foraging expeditions and were homeward bound for the night, discovering the crowd of enemies who surrounded their borders, had discreetly taken refuge like their associates on the tufts of grass everywhere around the margin of the space within which the Sanguines had been operating.

Two of these blacks, more courageous or cunning than their associates, Dr. McCook observed to slip into a little opening and disappear inside. They were presently followed by several Sanguines, who, however, shortly returned from within and proceeded with their surface explorations, apparently having found no clew to the main formicary. The blacks, however, had certainly safely entered their home. He greatly wondered at this, and regarded it as an evidence of remarkable cunning and skill in strategy on the part of the Fuscas, which had enabled them thus so rapidly and easily to close the opening to their nest and throw the invaders off the scent.

An hour after the commencement of the raid not more than half a dozen of the Sanguines remained upon the scene, the rest of their company having abandoned the search for this time at least. This corporal's guard of persistent scouts also gave up the search at last and marched back home, the secretive skill of the blacks having thus far prevailed for the protection of their colony.

The interesting fact in the history of these curious creatures to which Dr. McCook wished to call especial attention is, that their instinct for kidnapping has appeared to develop on the part of those who are the victims of it a corresponding strengthening of instinct in the way of concealment. The Fuscous ants are ready enough to defend their homes with their lives and often do it successfully when their numbers are great enough to overcome the superior physical power and warlike skill of their enemies. But the weaker colonies of Fuscas must always yield to the prowess and strength of the Sanguines, unless their cunning can put their invaders at a disadvantage.

The case just mentioned does not stand alone. At various times when the speaker had observed these black ants in such site that they are exposed to the attacks of the Sanguines, he had noticed that their nests were constructed very differently from those of colonies in neighborhoods not infested by Sanguines. In the latter positions it is the habit of the Fuscas to raise above the surface of the ground a flattened moundlet, or sometimes a

mound of considerable size. Over the summit and at the base of these elevations are scattered the gates or openings into the galleries without the least attempt at concealment. The whole formicary shows that its inmates dwell in security without any fear of such special perils as those described. On the contrary, the Fuscous colonies established in the near vicinity of their hereditary foes have a marked tendency to omit or subdue elevations above the surface, the dumpage from interior galleries being apparently scattered broadcast instead of piled above the central formicary. Their gates are few and cunningly concealed, and quantities of rubbish are scattered around with the evident intention of hiding the locality of their nest or making the approach to it more difficult. It has thus come about with these unfortunate blacks, as is the case with the human species, that the difficulties of life and perils to person, offspring and home, have developed a higher order of protective instinct.

A similar faculty Dr. McCook had observed in the case of an amber-colored ant, the Schauffuss ant, *Formica schauffussi*. He was watching the assault of a colony of Sanguines upon a Fuscous nest in the grounds of his friend Mrs. Mary Treat, Vineland, N. J., when he chanced to see a solitary individual Schauffuss moving back and forwards a little distance from the scene of invasion. Knowing that this ant is sometimes enslaved by the Sanguines he directed his attention upon her and easily perceived that she was putting finishing touches upon the closure of a little hole that marked the gate of her formicary. A tiny pebble was placed, then a few pellets of soil were added. Next the worker walked away, took a few turns as though surveying the surroundings, and cautiously came back. The coast was clear. Now she deftly crawled into the small open space, and the observer could see from the movements inside, and occasional glimpses of the tip of her antennæ, that she was completing the work of concealment from the inside. At last her task was done and all was quiet. Just then a single Sanguine warrior, apparently a straggler from the invader's army near by, or some independent scout it may be, approached the spot. It walked around the nest, which was indistinguishable from the surrounding surface; sounded or felt here and there with its antennæ; passed over the very door into which the Schauffuss ant had disappeared, and although its suspicions were evidently strongly awakened, it at last moved away. The speaker felt satisfaction that the Sanguine depredator had thus been baffled and that the instinct of home protection had proved too much for the wretched kidnapping cunning. However, his pleasure was somewhat clouded by the reflection that the slave-making scout would probably be back before long, accompanied by the host of its fellows, and do its work more surely. But the impression remained strong upon his mind that the Schauffuss colonists, like the Fuscous ones above alluded to, had decidedly modified their habits of nest

architecture to meet the perils arising from close neighborhood to their kidnapping enemies.

*Notes on the Geology of China.*—Prof. Heilprin read from Miss ADELE M. FIELDE the following notes on the geology of south-eastern China, which are of interest, inasmuch as nothing on the physical features of that section of the empire has as yet been published.

“I have been on a trip up the Han River, 130 miles, to the Pass between the Kwangtung and Fokien Provinces. The mountains slope steeply down into the river on both its sides for eighty miles, and a narrow path runs on each slope parallel with the river at varying distances above it. Some of the mountains are probably three thousand feet high, and the ridges at a distance appear so narrow that a man might stride and sit on them as on a saddle. The river keeps a general trend southward, its bends being short ones. Its delta covers several square miles. In all the lower part of its course it is kept in its channel by dikes, as its sandy bed is higher than the adjoining rice fields. Just above the city of Chow-chow-fu, thirty-two miles to the north of Swatow, the mountains begin to rise, and they are, like those near Swatow, almost wholly of granite. This rock extends up to Liu Ng, a town twenty-four miles further up the river. Stone No. 1, in the box sent herewith, is a specimen of this outcrop near the river. Ten miles further up the granite becomes very coarse, as in No. 2. Ten miles still further, or twenty-six miles from the mouth, the outcrops are, for a short distance, of whitish sandstone, like No. 3, and these are immediately followed by red sandstones, Nos. 4 and 5, which continue in mountain after mountain, gorge after gorge, precipice after precipice, for some sixty miles. These are magnificent exposures, the stratification showing very plainly, with lines of cleavage nearly at right-angles to the lines of deposit. The inclination is at all angles, some being level, some vertical and some showing splendid curves. Here and there are to be found apparent injections of another stone, which, I fancy, may be trap No. 6. I also found some streaks of landscape-sandstone, No. 7. In one place I found a huge mass of the speckled stone, pink, with brown spots, marked No. 8, in the box. This, like all the other specimens, is a portion of the great outcrop from a mountain side.

“Red sandstone, in some places, almost like dark shale, in others very hard and of a light color, extends to within ten miles of the pass. Towards its upper boundary I noticed much intermixture with light sandstone, and with a greenish stone, No. 9. The stratification of the latter was very plain, and in places the mountain path leads over the edges of the strata as they stand perpendicularly. Near the pass and also through the pass (which is four miles long, and is a wild gorge through which the river flows in a white torrent), the outcrops and boulders are again